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AUTHOR Fleming, James S.
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ABSTRACT

Shavelson's hierarchical facet model of self-concept was used with a sample of 158 college students, using a revision of Fleming's Self-Rating Scales (SRS). It was hypothesized that six factors would be identified in exploratory analysis corresponding to six SRS scales: self-regard, social self-esteem, physical appearance, physical abilities, verbal abilities, math abilities. First- and second-order confirmatory factor analyses offered further support for both the hierarchical model and the SRS. No significant sex differences in scale means were found. Academic influences on self-esteem were viewed in terms of Marsh's internal-external frame of reference hypothesis, which predicts positive paths from verbal and math abilities measures to verbal and math self-concept (SC), respectively, but negative paths from verbal abilities to math SC and from math abilities to verbal SC. The positive paths are due to external comparisons, which are peer-referenced, whereas the negative paths are due to self-referenced, internal comparisons. Results are seen as supporting the frame of reference hypothesis. (Author/SW)

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Academic Influences on Self-Esteem in College Students

James S. Fleming

California State University, Northridge

Running Head: ACADEMIC INFLUENCES ON SELF-ESTEEM

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Please send correspondence concerning this manuscript to:

J. S. Fleming, Ph.D.
Department of Psychology
California State University, Northridge
Northridge, CA 91330

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Abstract

Shavelson's hierarchical facet model of self-concept has stimulated much substantive and validation research. The model was operationalized in a college sample (N = 158) using the author's revised Self-Rating Scales (SRS). First- and second-order confirmatory factor analyses offered further support for both the hierarchical model and the SRS. No significant sex differences in scale means were found. Academic influences on self-esteem were viewed in terms of Marsh's (in press) internal-external frame of reference hypothesis, which predicts positive paths from verbal and math abilities measures to verbal and math self-concept (SC), respectively, but negative paths from verbal abilities to math SC and from math abilities to verbal SC. The positive paths are due to external comparisons, which are peer-referenced, whereas the negative paths are due to self-referenced, internal comparisons. Results were seen as supporting the frame of reference hypothesis.

Academic Influences on Self-Esteem in College Students

Shavelson's Hierarchical Self-concept Model

Shavelson and his associates (Shavelson, Hubner, & Stanton, 1976) proposed a multifacetted, hierarchical model of self-concept (SC) for students in which general SC is viewed as a higher-order factor, supported by academic and non-academic subcomponents. The latter in turn are determined by less general factors at the tertiary level. For academic SC, these include English SC and mathematics SC, as well as other specific subject matter self-concepts. For non-academic SC, there are physical, emotional, and social components. Physical SC is further divided into physical appearance and physical abilities, with social branching off into factors due to the influence of peers and significant others (e.g., family, teacher). Finally, at the lowest level, these facets are supported by evaluation of behaviors in specific situation.

General SC is thought to be quite stable, with the relative stability of the subordinate facets inversely related to their positions in the hierarchy (but see Byrne's [1984] review for reported exceptions to this rule). The factor structure is also presumed to be more differentiated with increasing age, with strongest

support for the hierarchy in adolescents.

The hierarchical model has stimulated considerable substantive and psychometric research (e.g., Byrne, in press, 1984; Byrne & Shavelson, in press; Fleming & Courtney, 1984; Marsh, in press; Marsh, Barnes, Cairns, & Tidman, 1984; Marsh & O'Neill, 1984; Marsh & Shavelson, 1985; Shavelson & Bolus, 1982; Song & Hattie, 1984). Although this research generally supports the model, certain modifications now appear necessary. For example, physical appearance seems more related to the social dimension than to physical abilities (Fleming & Courtney, 1984; Marsh, 1985). This finding calls into question the general physical factor. More importantly for educational psychologists, correlations between math and verbal SC often tend to be very close to zero (Marsh & Shavelson, 1985; Marsh, in press), though support for a higher-order academic factor still exists (Byrne & Shavelson, in press).

Operationalizing the Model

For grammar school and secondary school children, Brookover's (1962) scales are sometimes used to assess the academic dimensions (e.g., Byrne & Shavelson, in press; Shavelson & Bolus, 1982). Marsh developed the Self-Descriptive Questionnaire (SDQ; Marsh, Parker, & Smith, 1983) for lower grades, and the SDQ II (Marsh,

Parker, & Barnes, 1985) for upper grades. For late adolescents and college students, he designed the SDQ III (Marsh & O'Neill, 1984). Fleming and Courtney's (1984) Self-rating Scales (SRS)--a multidimensional extension of the Janis and Field (1959) Feelings of Inadequacy Scale--were designed for use with college students as well as secondary school students. The SRS was revised for the present study to include separate verbal and math self-esteem scales, rather than the single, general academic scale used previously, which was highly oriented toward verbal SC. The current version of the SRS includes scales for: Self-regard (GEN; a global measure), Social Self-Esteem (SOC), Physical Appearance (PHYS APP.), Physical Abilities (PHYS ABIL.), Verbal Abilities (VERB SC), Math Abilities (MATH SC), and Social Anxiety. (Since the latter scale is not a self-esteem measure per se, this scale was not used in the present study.)

Predicted Factor Structure for the SRS

It was hypothesized that six factors would be identified in exploratory analysis, corresponding to the six SRS scales. It was further hypothesized that (a) the correlation between VERB SC and MATH SC would be trivial (as in the studies cited above), and (b) a higher-order, general factor could be identified in a confirmatory

factor model, supported by the six first-order factors corresponding to the scales. (More subtle tests of hierarchical structuring, such as separate higher-order physical and academic dimensions, could not be tested with this data; such models would not be identified.)

Structural Model for Ability, Achievement, and Self-Esteem

A longitudinal path model was employed to test the predictibility of VERB and MATH SC in college students from high school ability and achievement measures. Abilities were measured by verbal and mathematics SAT scores (SAT V and SAT M), and achievement was measured by high school grade-point average (HSGPA). The full model (i.e., one with all plausible paths present) is shown in Figure 1. The circular figures represent factors from the confirmatory analysis, with each first-order factor indicated by four items. The second-order self-esteem factor is indicated by each of these first-order factors.

Insert Fig. 1 about here

Marsh's Frame of Reference Model

The paths from SAT V to VERB SC and from SAT M to MATH SC in Figure 1 may seem counterintuitive, but

negative paths are predicted by Marsh's (in press) "frame of reference" model. According to Marsh, students employ an external frame of reference when rating themselves relative to classmates, but use an internal frame of reference in comparing one aspect of SC with another--particularly in comparing VERB and MATH SC. Because internal comparisons are relative judgments of one ability versus another, students tend to elevate their perceived strengths in relation to their perceived weaknesses. Thus, a student who is average in both math and English, but relatively better at math, might provide a higher than average self-rating for MATH SC when using such an internal basis for the comparison.

The low correlation between VERB and MATH SC seems paradoxical because verbal and mathematical abilities are ordinarily postively correlated. However, the positive paths from abilities to their corresponding SCs along with the negative paths to their opposing SCs can explain the low correlation between VERB and MATH SC: The internal and external comparison processes cancel each other to a certain degree, resulting in a near zero correlation. If math skills (say) are held constant, "it is the difference between math and verbal skills that predicts Math SC, and high verbal skills will actually detract from a high math self-concept" (Marsh,

in press).

The processes described by Marsh are conceptually somewhat similar to the compensatory model proposed by Winne and Marx (1981, April; also discussed by Byrne, 1984). According to Winne and Marx, one may compensate for academic deficits by giving relatively higher ratings to social or physical skills, or vice versa.

Method

Subjects and Procedure

Students from first-year psychology courses at California State University, Northridge, participated in this study as one means of satisfying a course requirement. Care was taken to maintain anonymity, because access to student records was necessary. Student file numbers were used to access the records, without students' names appearing on any forms. After the data base was created, file numbers were removed. In addition, students were asked permission to access their records, and only those who gave this permission were used in this study.

There were 158 participants (37 men and 121) women in the study for whom high school records were available. Although the students who participated were enrolled in a general studies course their majors showed that some groups were disproportionately represented.

Many students were in the social sciences (21.9%) and professional studies (15.4%), whereas only 10.4% were in the "hard" sciences, mathematics, and engineering. Another 7.0% were in the arts and humanities, and 6.0% were business majors. A large number (39.3%) were undeclared majors. Women (69.4%) were also overrepresented.

Testing took place in small groups; the SRS and several other forms (not used in this study) were self-administered with a minimum of instruction, and subjects were debriefed later in the school term by a posted writeup explaining the purpose.

Results and Discussion

Factor Analyses of the SRS

The six predicted oblique factors were identified corresponding to the SRS scales. (Because of space limitations, results are not shown.) The four best indicators of each scale were selected for testing the structural hypotheses via the LISREL VI program (Jöreskog & Sörbom, 1983). The correlations and reliabilities of the summated scales based on just the four items are shown in Table 1. Internal consistencies are all quite acceptable for these four-item scales (range = .72 to .88, median = .78). Although the correlation between Verb and Math SE is statistically

significant (r = .16, p < .05), it is not particularly large.

Insert Table 1 about here

In the confirmatory factor analysis the correlation between VERB and MATH SC (Table 2) is close to zero (r = .01; significance is not reported because this is not an independent parameter of the confirmatory model). The standardized first-order factor loadings are significant at the .001 level, and they are all of respectable size (range = .576 to .941, median = .767).

Insert Table 2 about here

Structural Model

The structural diagram for the reduced model that was accepted, showing only statistically significant paths, is displayed as Figure 2. For this model, $\chi^2(317, N = 158) = 552.84$, $p < .001$, with the ratio of chi square to its degrees of freedom equal to 1.74. The LISREL adjusted goodness of fit index, (AGFI, a zero-to-one measure) was .762 (relative to a maximum possible fit of 1.0), and the residual root-mean-square correlation (rms) was .083. This analysis included both

the measurement model (factor analysis) and the structural model (path analysis).

For the full model [χ^2(314, N = 158) = 542.90, p < .001; AGFI = .761; rms = .074], paths from HSGPA to the VERB and MATH SC measures were not significant. It is usual to find strong paths from achievement to SC, but most studies either show paths from general achievement to general SC (e.g., Bachman & O'Malley, 1977), or from specific achievement to specific SC (Marsh, in press). For this sample, the paths from general achievement to specific SCs did not predict well. However, the paths from the specific academic abilities to their corresponding SCs were significant and substantial.

The second-order loadings for the academic measures on higher-order SC, though significant, are distinctly lower than the loadings for the other first-order factors. This probably reflects a diminished saliency of the academic dimensions for this sample as compared to others (cf. Marsh & Hocevar's [1985] analyses for students in grades 2 - 5). As previously noted, a large proportion of the students were undeclared majors, which may indicate a lack of academic commitment for some. Perhaps with a sample of juniors or seniors, or with students from universities with more competitive entrance requirements, these coefficients would be

stronger.

Marsh's frame of reference hypothesis was only partially confirmed in this study; though the path from SAT V to MATH SC was negative and significant, the path from SAT M to VERB SC was not significant in the full model (the coefficient was only -.01 in that model). It is possible that the special characteristics of this sample again played a role in the findings. It was noted that there were only a small number of math, engineering, and "hard" science majors participating. For the sample under consideration, verbal skills--hence VERB SC--are perhaps more salient then they might be for the general student population. If most students perceived themselves as higher in verbal skills than math skills,[1] then internal comparisons should be high for VERB SC but low for MATH SC; therefore, good math skills are less likely to compensate for low verbal skills for this group of students. With such sampling limitations in mind, the present results can be interpreted as being consistent with Marsh's frame of reference model and with Winne and Marx's compensatory model, and yet still consistent with Shavelson's hierarchical model.

Insert Fig. 2 about here

Sex Differences

In their earlier report on sex differences in the SRS, Fleming and Courtney (1984) found a sizable sex difference on only one of the scales: Physical Abilities. In the present sample, which is somewhat smaller than in the previous study, no sex differences were found in a multivariate analysis of variance, with $F(6,151) = 1.32$, n.s.

Conclusions

The scales used in this study were designed to measure major facets of Shavelson's hierarchical model. First- and second-order factor analyses offered further support for this model in a college sample. This study differs from Fleming and Courtney's (1984) prior analysis of the SRS in that a structural model was formulated and tested via confirmatory factor analysis, and that separate verbal and mathematics SC scales were employed. Although VERB SC and MATH SC were significantly correlated, the correlation was by no means a large one. Results provide further support for both the construct validity of the hierarchical model and the SRS.

A second focus was on the structural relations between academic aptitude/ability, achievement, and the academic SC scales. It was tentatively concluded that the results support Marsh's (in press) internal-external frame of reference hypothesis, if a sample bias toward highly verbal subjects is taken into account. Although use of objective (as opposed to self-report) achievement and ability measures was a strength of the study, there was a corresponding loss of generality, as the sample for which these measures was available was not entirely typical the general student population.

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Footnote

[1]There are good reasons to believe that this assumption may be reasonable. Although items for the MATH and VERB SC are not parallel, they are at least the same in number and item format. The difference in means favoring VERB SC was statistically significant, with $t(157) = 3.53$, $p < .001$. Mean differences also favored verbal skills for high school SAT scores in that SAT V was larger than local norms--based on 2,970 freshmen--with $z(\text{verb}) = 0.194$. Math scores were close to the mean, with $z(\text{math}) = 0.010$. Moreover, there is some evidence that there is a difference in saliency between the two academic SC scales. Although importance ratings were not collected in this study, such differences were quite large in a data set collected by Fleming, Angel-Lahr, Iventosch, Spooner, and Green (1984, April), in which each facet of self-esteem was rated on a five-point importance scale. The result--not previously pulished--favored a greater importance for the VERB SC scale, with $t(254) = 7.91$, $p < .001$.

Table 1

Correlations and Reliabilities for Simple Summated SRS Scales

		1	2	3	4	5	6
1	GEN	.78					
2	SOC	.45	.73				
3	PHYS APP.	.62	.53	.79			
4	PHYS ABIL.	.47	.29	.37	.85		
5	VERB SC	.21	.25	.26	.08	.72	
6	MATH SC	.17	.26	.18	.19	.16	.88

Note. Diagonal entries contain coefficient alpha. Each scale is represented by its four most salient items in the exploratory factor analysis.

Table 2

Standardized First-order Confirmatory Factor Loadings, Uniquenesses, and Factor Correlations for SRS Items

	Factor						
Variable	Gen	Soc	Phys App	Phys Abil	Verb	Math	U^2
GEN1	.737[a]						.453
GEN2	.557						.687
GEN3	.756						.424
GEN4	.759						.420
SOC1		.576[a]					.667
SOC2		.661					.562
SOC3		.614					.622
SOC4		.729					.466
PHYS AP1			.600[a]				.638
PHYS AP2			.781				.385
PHYS AP3			.782				.384
PHYS AP4			.661				.561
PHYS AB1				.661[a]			.560
PHYS AB2				.754			.430
PHYS AB3				.854			.269
PHYS AB4				.808			.345

(table continues)

	Factor						
Variable	Gen	Soc	Phys App	Phys Abil	Verb	Math	U^2
VERB1					.627[a]		.607
VERB2					.750		.438
VERB3					.598		.642
VERB4					.599		.641
MATH1						.806[a]	.353
MATH2						.732	.465
MATH3						.941	.115
MATH4						.766	.413

Factor correlations:[b]

GEN	1.000					
SOC	.611	1.000				
PHYS APP.	.787	.610	1.000			
PHYS ABIL.	.508	.394	.508	1.000		
VERB SC	.241	.186	.240	.155	1.000	
MATH SC	.186	.144	.186	.120	-.012	1.000

Note. Loadings fixed at zeros are blanked.

[a]Denotes a fixed parameter.

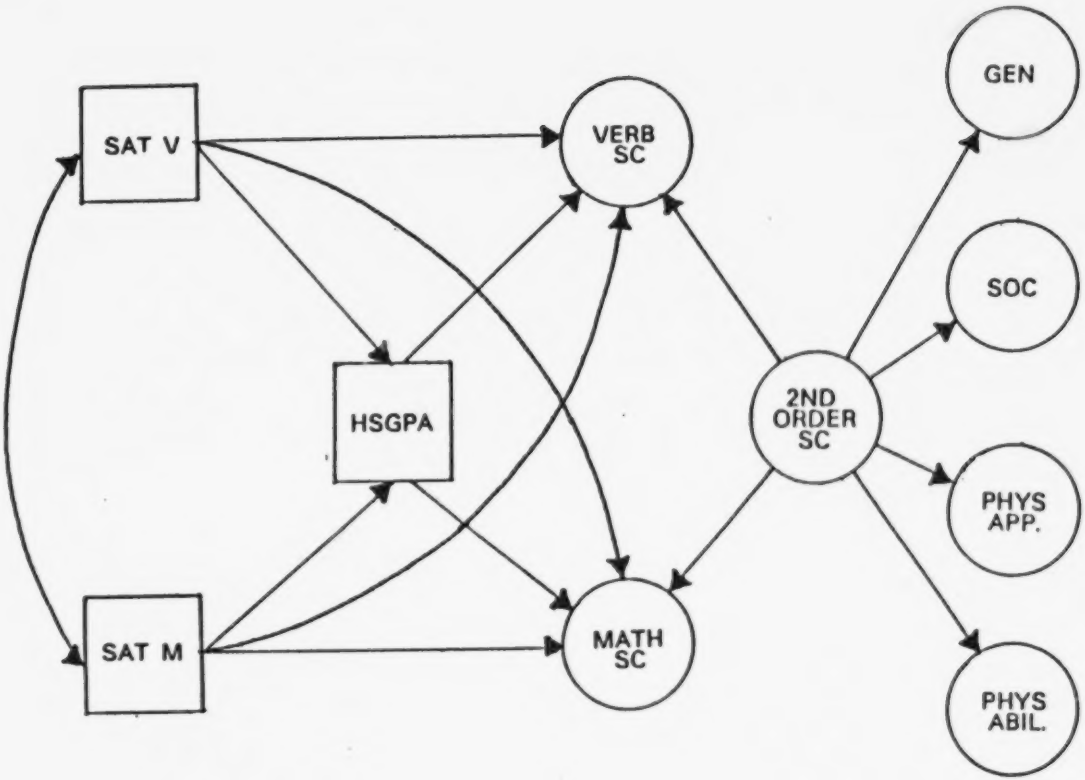
[b]Correlations and covariances between factors are not independent parameters of the second-order model.

Figure Captions

Figure 1: Posited full structural model of academic influences on self-esteem. Boxes represent measured variables, circles represent factors.

Figure 2: Reduced structural model showing only statistically significant paths. All paths are standardized.

[a]Denotes a fixed parameter.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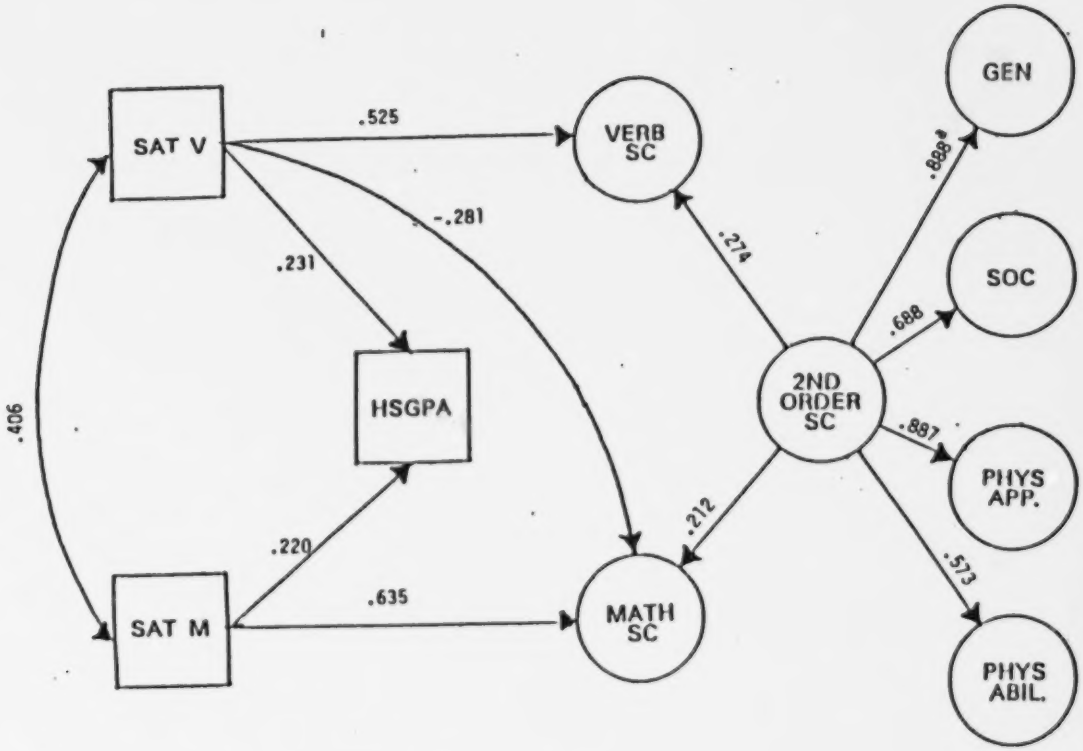
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